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Standards, Royalty Stacking, and Collective Action

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I. INTRODUCTION

It is well known that modern computing, telecommunications, and consumer electronics devices are covered by multitudes of patents. In 2011, patent aggregator RPX estimated that an average smartphone is covered by at least 250,000 different patents, up from only 70,000 in 2000.[2] To the extent that the multiple owners of patents covering a single standard or device charge royalties to the manufacturer, the cumulative effect of those royalty demands can be appreciable. This phenomenon is often called royalty "stacking."

As recently explained by the Federal Circuit, "[r]oyalty stacking can arise when a standard implicates numerous patents, perhaps hundreds, if not thousands. If companies are forced to pay royalties to all [patent] holders, the royalties will "stack" on top of each other and may become excessive in the aggregate."[3] One 2013 study estimated that the size of the royalty stack for a hypothetical $400 smart phone was $120 (excluding the value of cross-licenses and other non-monetary compensation), or 30 percent of the overall product price.[4]

Though royalty stacking is often characterized as affecting only standardized technologies, it is equally important in many non-standardized technologies. The perception that royalty stacking particularly affects standardized technologies is likely created by the many well-known examples of standards as to which thousands of patents have been declared as essential, primarily in the wireless telephony and computer networking markets. [5] This perception is reinforced by the fact that the manufacturer of a product complying with a particular standard must include all technical features required by the standard in its product, thereby infringing each of the patents that are essential to the standard.

With technical features that are not required by a standard, manufacturers sometimes have the flexibility to include or exclude them based, at least in part, on patent royalty burden. Nevertheless, given the thousands of patents covering non-standardized features of modern

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[2] RPX Corp., Registration Statement on Form S-1 at p. 55 (Jan. 21, 2011).

[3] *Ericsson, Inc. v. D-Link Systems, Inc.*, 773 F.3d 1201, 1209 (Fed. Cir. 2014).

[4] Ann Armstrong, Joseph J. Mueller, & Timothy D. Syrett, *The Smartphone Royalty Stack: Surveying Royalty Demands for the Components Within Modern Smartphones* (Working Paper, May 29, 2014), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2443848.

[5] *See* KNUT BLIND ET AL., STUDY ON THE INTERPLAY BETWEEN STANDARDS AND INTELLECTUAL PROPERTY RIGHTS (IPRS), FINAL REPORT 62 (2011), *available at* http://ec.europa.eu/enterprise/policies/european-standards/files/standards_policy/ipr-workshop/ipr_study_final_report_en.pdf) (reporting the numbers of patents believed to be essential to standards including WCDMA (1000 patent families), LTE (1000 patent families), MPEG-2 and MPEG-4 (800 patents in 160 patent families), optical disc drive standards (2200 patent families), and DVB-H (30 patent families)).

consumer devices, not all of which can be excluded from a product that has any hope of commercial viability, royalty stacking affects both standardized and non-standardized technologies equally.[6]

This article summarizes economic and legal theories regarding royalty stacking in view of recent U.S. case law that has addressed the impact of stacking on the reasonableness of patent royalty rates. It critiques the Federal Circuit's decision in *Ericsson v. D-Link*, holding that actual evidence of stacked payments must be proffered to support a jury instruction on stacking. It concludes with a proposal for reducing the impact of royalty stacking through collective royalty cap negotiation and a call for antitrust agencies to confirm that such negotiations would have pro-competitive benefits and be analyzed under a rule of reason standard.

II. THE ECONOMIC DEBATE OVER STACKING

For nearly a decade scholars have debated the potential impact of royalty stacking on products in the wireless telecommunications and computer networking markets. One school of thought, exemplified by the writings of Mark Lemley and Carl Shapiro, argues that stacking will result in higher prices for consumers.[7] They predict this outcome both because (1) patent holders and product manufacturers are expected to maximize their margins (the phenomenon known as "double marginalization"), and (2) the holders of multiple complementary patents will each raise their royalties to a level that will depress sales of the end product and potentially reduce their individual profits (the well-known problem of "Cournot complements").[8] They also argue that stacking is likely to exacerbate and amplify the rent-increasing potential of patent hold-up behavior (i.e., by introducing multiple patent holders with potential hold-up power).[9]

Others, notably Greg Sidak, Damien Geradin, and Anne Layne Farrar,[10] have challenged this line of reasoning. In addition to disagreement over the theoretical conclusions drawn by Lemley and Shapiro, they observe that despite the large number of patents covering standards for technologies such as 3G wireless telephony and Wi-Fi wireless networking, these technologies have flourished in the marketplace, suggesting that in practice royalty stacking is not as large an

[6] *See* Jorge L. Contreras & Richard J. Gilbert, *A Unified Framework for RAND and other Reasonable Royalties*, __ BERKELEY TECH. L.J. ___ (2015, forthcoming).

[7] Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991 (2007); Carl Shapiro, *Navigating the Patent Thicket: Cross-Licenses, Patent Pools, and Standard Setting*, *in* 1 INNOVATION POLICY AND THE ECONOMY 119, 124 (Adam B. Jaffe et al. eds., 2001).

[8] *See* Lemley & Shapiro, *supra* note 7, at 2013-14.

[9] *Id*. at 2011.

[10] *See* J. Gregory Sidak, *Holdup, Royalty Stacking, and the Presumption of Injunctive Relief for Patent Infringement: A Reply to Lemley and Shapiro*, 92 MINN. L. REV. 714, 718 (2008); Damien Geradin, Anne Layne-Farrar, & Jorge Padilla, *The Complements Problem within Standard-Setting: Assessing the Evidence on Royalty Stacking*, 14 BOSTON U.J. SCI. TECH. L. 144 (2008); Damien Geradin & Miguel Rato, *Can Standard-Setting Lead to Exploitative Abuse? A Dissonant View on Patent Hold-Up, Royalty Stacking and the Meaning of FRAND*, 3 EURO. COMP. J. 101 (2007).

issue as once feared.[11] Even more provocatively, Einer Elhauge has argued that stacking leads not to royalties that exceed optimal rates, but to royalties that are at or below optimal rates.[12]

III. STACKING AND REASONABLENESS OF ROYALTIES

The economic debate highlighted above focuses on the potential impact of royalty stacking on consumer prices, firm profits, and market efficiency. But legal questions have also emerged with respect to royalty stacking, particularly when patent holders are obligated to charge no more than "reasonable and nondiscriminatory" ("RAND") royalties for patents essential to industry standards. Both under a RAND obligation, and when a court is determining a "reasonable royalty" to calculate patent damages, the royalty charged for any given patent must be viewed as part of the larger patent royalty burden of the overall product.

That is, under well-established principles of patent damages law, a reasonable royalty should be based on the incremental value of the patented technology to the overall product.[13] The incremental value of a particular patented technology to a larger product must, it seems, depend on the number of additional patented and non-patented technologies that exist side-by-side with the technology under consideration. Thus, the existence and extent of stacking is important to the determination of reasonable patent royalty levels.

Thus, in *Microsoft Corp. v. Motorola, Inc.*, the federal district court was required to determine whether Motorola's demand for royalties on patents covering the 802.11 Wi-Fi standard complied with its obligation to grant licenses on a RAND basis.[14] In analyzing the level of Motorola's proposed royalties, the court found "significant stacking concerns."[15] Specifically, it observed that

> [t]here are at least 92 entities that own 802.11 [standard-essential patents]. If each of these 92 entities sought royalties similar to Motorola's request of 1.15 % to 1.73 % of the end-product price, the aggregate royalty to implement the 802.11 Standard, which is only one feature of the Xbox product, would exceed the total product price.[16]

On this basis, the court determined that the royalty Motorola sought was unreasonable, because "if everyone wanted the same deal [as Motorola], it would quickly make the end-product price untenable commercially."[17] The court also noted that, in this case, stacking concerns were heightened because Motorola's patents made only "minimal contribution" to the 802.11 standard.[18]

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[11] *See, e.g.*, Geradin & Rato, *supra* note 10, at 128; Geradin, Layne-Farrar & Padilla, *supra* note 10, at 159-63.

[12] Einer Elhauge, *Do Patent Holdup and Royalty Stacking Lead to Systematically Excessive Royalties*? 4 J. COMP. L & ECON. 535 (2008).

[13] *Ericsson, Inc. v. D-Link Systems, Inc.*, 773 F.3d 1201, 1232, 1235 (Fed. Cir. 2014).

[14] *Microsoft Corp. v. Motorola, Inc.*, Findings of Fact and Conclusions of Law, 2013 U.S. Dist. LEXIS 60233 (W.D. Wash., Apr. 25, 2013).

[15] *Id.* at 213.

[16] *Id.*

[17] *Id.* at 213-14 (quoting testimony of Dr. Matthew Lynde).

[18] *Id.* at 214.

In *In re Innovatio IP Ventures, LLC*,[19] the court was required to calculate the "reasonable" royalty for patents covering different aspects of the 802.11 standard. In doing so, it expressly recognized that it must "evaluate a proposed RAND rate in the light of the total royalties an implementer would have to pay to practice the standard" and "consider whether the overall royalty of all standard-essential patents would prohibit widespread adoption of the standard."[20] Accordingly, the existence of royalty stacking as to the 802.11 standard played a significant role in the court's fixing the upper limit on the applicable royalty at the manufacturer's existing profit margin.[21]

IV. EVIDENCE OF STACKING?

Like the district courts in *Microsoft* and *Innovatio*, the Federal Circuit in *Ericsson, Inc. v. D-Link Systems, Inc.* acknowledged the patent holder's obligation to license its patents essential to the 802.11 standards on RAND terms.[22] Unlike the earlier cases, however, the RAND royalty determination in *Ericsson* was made by a jury rather than the court. In its charge to the jury, the trial court declined to issue any instructions specifically regarding royalty stacking.[23] On appeal, among other things, D-Link challenged the trial court's refusal to instruct the jury as to royalty stacking.

The Federal Circuit rejected D-Link's challenge and held that the district court did not err by refusing to instruct the jury on royalty stacking.[24] It reasoned that:

> A jury … need not be instructed regarding royalty stacking unless there is actual evidence of stacking. The mere fact that thousands of patents are declared to be essential to a standard does not mean that a standard-compliant company will necessarily have to pay a royalty to each [patent] holder. In this case, D-Link's expert 'never even attempted to determine the actual amount of royalties Defendants are currently paying for 802.11 patents.'[25]

Thus, because D-Link did not produce specific evidence that it was paying royalties to multiple patent holders for the 802.11 standard, the court found that stacking was not "relevant" to the case.[26] This reasoning is both surprising and at odds with that of the lower courts in *Microsoft* and *Innovatio*. Most importantly, it misconstrues the actual risk associated with royalty stacking.

There is a world of difference between Product A, which is priced at $100 and covered by one patent bearing a 1 percent royalty ($1 royalty burden), and Product B, which is also priced at $100 but is covered by fifty patents each bearing a 1 percent royalty ($50 royalty burden). Assuming that each patent holder is subject to a RAND licensing commitment, the 1 percent royalty charged by the holder of the patent covering Product A is far more likely to be

[19] 2013 U.S. Dist. LEXIS 144061 (N.D. Ill. Oct. 3, 2013).
[20] *Id*. at 69-70.
[21] *Id*. at 166-67.
[22] 773 F.3d 1201, 1229 (Fed. Cir. 2014).
[23] *Id*.
[24] *Id*. at 1234.
[25] *Id*.
[26] *Id*. at 1234-35.

"reasonable" than any of the 1 percent royalties charged by the holders of the patents covering Product B. A fact finder assessing the reasonableness of the 1 percent royalty charged on Product B must be made aware of the fact that there are forty-nine other patents covering Product B. Without this information, the fact finder would have no way to differentiate between the reasonableness of the royalty rates charged on Product A and Product B.

Thus, assuming that these two products are in the same general industry and market category, the fact finder could determine that a 1 percent royalty was perfectly reasonable in each case. But, as most would agree, 1 percent is probably *not* reasonable as to Product B (assuming that all of the patented technologies contribute comparable value to the overall product).

For this reason, the court's dismissal in *Ericsson* of "[t]he mere fact that thousands of patents are declared to be essential to a standard"[27] is puzzling. This "mere" fact is, in actuality, highly relevant to the reasonableness of the royalty levied on the relevant standard. That is, as discussed above, a reasonable royalty should be based on the incremental value of the patented technology to the overall product.[28] A relevant factor in determining the incremental value of a particular patented technology must be the number of additional patented technologies included in the same product. Or, in other words, the level of stacking experienced by the product.

What is less relevant is whether the accused infringer is then paying royalties to other patent holders, and in what amounts. The answer to this question depends on a host of factors, including the willingness of other patent holders to assert patents against the accused infringer—which may hold an arsenal of its own patents that they are not willing to face—and whether the accused infringer is intentionally violating those other patents without paying royalties.

Most importantly, whether the accused infringer is paying other patent holders depends in large part on the timing of different infringement suits. Thus, in the above example, when the first of fifty patent holders enforces its patent against the infringer, it may be paying no other royalties. When the second patent holder sues, the infringer may be paying royalties to the first patent holder. And when the third sues, the infringer may be paying royalties to the two prior patent holders. And so forth. Does this mean that, in the first suit, the infringer can introduce no evidence of stacking while in the second suit, it can introduce evidence of the amounts paid to the first patent holder, and so on?

Such a result makes little sense and, if anything, will encourage a "race to the courthouse" by patent holders wishing to capture the maximum royalty before the infringer is burdened by other royalty obligations. To avoid these nonsensical scenarios, the jury should be instructed in each suit that there are fifty patents covering the relevant product. This fact will help the jury to determine whether each asserted royalty is reasonable, independently of the timing of the enforcement suit.

V. STACKING AND COORDINATION

The principal risk associated with royalty stacking is that multiple independent royalty demands on a single product will result in an aggregate royalty that is above the optimal level.

[27] *Id*. at 1234.

[28] *Id*. at 1232, 1235. *See also* note 13, *supra*, and accompanying text.

This situation is most likely to occur when royalty demands are made in an independent and uncoordinated manner, as they typically are, with each patent holder seeking to maximize its own gain. But if coordination of royalty rates were to occur among patent holders and manufacturers *ex ante* (before manufacturers have invested significant resources in standardized products), such issues could potentially be avoided.

One well-known method for addressing competing royalty demands on a single standard or product is the creation of patent pools. In patent pools, patent holders agree on a single royalty that will be charged for a license to all of the patents in the pool, and then divide the royalty among themselves according to an agreed formula.[29] Patent pools exist for several important industry standards, including 802.11, though these pools often contain only a subset of the patents that are essential to the standard. Likewise, there are many standards for which the required essentiality analysis to form a pool would be cost-prohibitive.[30] Accordingly, patent pools have not proven to be a useful general solution to the risk of royalty stacking, though they work well in some circumstances.[31]

Outside of patent pools, collective agreement on maximum aggregate per-product or per-standard royalty caps could eliminate the unpredictable and unbounded escalation of royalty demands above optimal levels. Numerous such proposals have been made in the past.[32] One of the primary reasons that such proposals have not been widely adopted, however, is a fear that joint discussion and agreement on royalty rates among competitors could preclude price competition and thereby violate the antitrust laws.[33] Several commentators have expressed concern that such coordination could lead to a manufacturer-based oligopsony that could improperly exert market power to depress patent royalties, possibly to zero.[34]

These critiques, however, disregard the potentially pro-competitive benefits of the royalty cap agreements described above. Were such arrangements analyzed under a "rule of reason" approach, then any actual anticompetitive harms could be appropriately weighed against these pro-competitive benefits. Such an approach was advocated a decade ago by FTC Chairman Deborah Platt Majoras, who explained that "joint ex ante royalty discussions . . . can be a sensible

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[29] Jorge L. Contreras, *Fixing FRAND: A Pseudo-Pool Approach to Standards-Based Patent Licensing,* 79 ANTITRUST L.J. 47, 75-78 (2013); Carl Shapiro, *Navigating the Patent Thicket: Cross-Licenses, Patent Pools, and Standard Setting*, in 1 INNOVATION POLICY AND THE ECONOMY 119, 124 (Adam B. Jaffe et al. eds., 2001).

[30] *See* Contreras, Fixing FRAND, *supra* note 29, at 77-78.

[31] One promising new approach has been developed by Intellectual Property Exchange Intl. (IPXI), which offers unitized licenses of pools of patents essential to standards such as 802.11n. IPXI, Offerings—WFN1 ULR Contract Overview, https://www.ipxi.com/offerings/wfn1/wfn1.html.

[32] *See* Contreras, Fixing FRAND, *supra* note 29, at 88 (discussing various aggregate royalty capping proposals and making a new proposal based on a "pseudo-pool" structure). *See also* EUROPEAN COMMISSION, PATENTS AND STANDARDS – A MODERN FRAMEWORK FOR IPR-BASED STANDARDIZATION 140 (Mar. 25, 2014) (noting potential promise of pseudo-pool approach to simultaneously address hold-up and stacking issues).

[33] Contreras, Fixing FRAND, *supra* note 29, at 88.

[34] *See* J. Gregory Sidak, *Patent Holdup and Oligopsonistic Collusion in Standard-Setting Organizations*, 5 J. COMPETITION L. & ECON. 123, 126, 142–51 (2009) ("*ex ante* collective action that is privately undertaken in an SSO to counteract potential patent holdup may facilitate, if not serve as an outright façade for, horizontal price fixing by oligopsonists of the patented input").

way of preventing hold up, which can itself be anticompetitive."[35] Michael Carrier also discounts the risk of anticompetitive oligopsonistic behavior by manufacturers of standardized products for several reasons. These include (i) the participation of patent holders in royalty cap discussions, (ii) the influence that patent holders wield in the standardization process, (iii) unpredictability regarding the precise patents that will ultimately be included in a standard, and (iv) the practical difficulty faced by manufacturers who might otherwise wish to reduce their purchases to depress prices.[36]

VI. CONCLUSION

Despite ongoing academic debate, courts, regulators, and the private sector have recognized royalty stacking as a potentially significant factor affecting the adoption of technical standards and the price and availability of consumer products. Courts have diverged, however, regarding requirements for introducing evidence of stacking at trial.

This inconsistency should be corrected, and the Federal Circuit should explicitly recognize the presence of royalty stacking as a factor impacting the potential reasonableness of patent royalties—both in terms of private RAND commitments and patent damages analysis. To encourage agreements establishing aggregate royalty caps that can reduce the potential for royalty stacking, antitrust authorities should clarify that such arrangements will be analyzed under a rule of reason approach weighing pro-competitive benefits against actual competitive harms.

[35] Deborah Platt Majoras, Remarks at the Standardization and the Law Conference: Recognizing the Procompetitive Potential of Royalty Discussions in Standard Setting 7-8 (Sept. 23, 2005), *available at* http://www.ftc.gov/speeches/majoras/050923stanford.pdf.

[36] MICHAEL A. CARRIER, INNOVATION FOR THE 21ST CENTURY: HARNESSING THE POWER OF INTELLECTUAL PROPERTY AND ANTITRUST LAW 337-38 (2009).